RADIO TO ELECTRONICS;

HOBBY TO CAREER

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Society of Wireless Pioneers

THE AMATEUR LICENSE

As the mailman approached the door, he had a knowing smile on his face. He knew that the small envelope he was about to deliver contained something he had been asked about over and over for the past six weeks.

As Frank met him at the door, readying his usual question "Did it come yet?", he saw the smile and then the envelope. With great expectations, he took the mail and tore open the letter with FCC in the return address corner. With a yell heard for two blocks in any direction - "I passed, I passed!" And so on September 10, 1935 W6MVL was born. The excitement culminated a string of activities during the past year; it also opened a lifetime of first radio, then electronics; first hobby and then exciting career.

The story really began a year earlier when Frank's dad, who was also named Frank, came in after a hard day's work on the WPA. "How would you like to visit a ham station?" Frank asked Frank. "A what?" answered the younger one. "This fellow I worked with today said he has his own radio station and can talk to people all over the world. He wanted to know if we'd like to see it tonight."

"Wow, let's go. I'm ready now." And so jumping into the 1934 Chevy they drove the mile it took to get to "Speed's."

After introductions, we all went into the shack. There were tubes, and wires, and parts all connected to an aerial and a microphone. This amazing sight was made even more enthralling as the blue glow of some big 866 tubes got brighter and brighter as Speed called, "CQ, CQ this is W6FMO calling." After a moment, he stopped calling and started to listen. Sure enough, someone across town was calling W6FMO and in a few minutes more acquaintances were made. Before this session was over, it was 3 o'clock in the morning - with work and school beckoning in just a few hours.

Frankly speaking, as it were, the discussion next day was how do we get a ham station? During the next few days, Speed helpfully answered questions with:

> Come to our radio club meetings every Tuesday night.
>
> Come early so you can learn the code and the theory.
>
> Stay for the meeting and meet the other hams.
>
> Try your luck at the raffle after the meeting.
>
> Finally, go upstairs for coffee and hot dogs prepared by the hams' wives who had been playing bridge above while the club meeting was going on down stairs.

That first meeting was sort of a blur. There must have been 50 to 60 hams there sporting badges with their call letters on them. There were all kinds of discussions going on about the virtues of Morse code vs. phone, vertical vs. horizontal antennas, how close to the edge of the band one could work, etc., etc. There was also a group of people standing in a small room adjoining the main clubroom.

Roy, W6KTY, was the classroom instructor. He was an old boomer telegraph operator who used either Morse or Continental codes on the air. He was a task master - Don't say dot-dash; say dit-dah - Don't learn the code groups as so many dots and dashes; sound out or whistle dit-dah as you see an A - Don't send with your fingers; flex your wrist - Keep your elbow on the table, etc., etc!

The ARRL License Manual was the bible for learning about frequencies, condensers, coils, resistors, tubes, etc. Again, Roy was the quiz master, making sure answers to his questions were exact.

After about three months, Roy put the pressure on the gang to start getting ready to go visit "Uncle Charlie", the Federal Communications Commission, (The FCC). Several hints about relaxing; don't sweat it, take your time, etc., etc., were all forgotten when the examination time came at the FCC office.

"Morse Code" sounded like it was a hundred words a minute; fingers would not write the characters; all the characters blended together; and in about a tenth of a second the five minute code test was over.

Everyone in the room was worried, anxious and fidgety, as the Radio Inspector (The "RI") announced names. Some faces fell, but others, including Frank's, lit up - sort of like those 866 rectifier tubes of Speed's.

For the ones who passed receiving, they now had to get their fingers uncramped from writing and ready for sending. Although sometimes people did fail sending, everyone today breezed through and were then given the written theory test.

After reading, writing, agonizing and drawing, one by one the people began to disappear and ponder their fate. It was common knowledge that it took 6 weeks for the FCC to process applications and examinations. It was also understood that if you heard from the FCC within 6-10 days - you had flunked!

Well, 10 days passed in late July and there was a sigh of relief by Frank. But nothing would match the excitment, thrill and almost disbelief that everything had worked out so well, that greeted the mailman on that September morning.

HIGH SCHOOL AND HOBBY

So you are W6MVL? What now? First things first, so Frank had to get enrolled for his first year of high school. In those days it was hard to foresee anyone going to college when the Great Depression had wiped out so many fortunes and jobs. Thanks to good counselling by "big" Frank and the high school officials, a pre-academic high school series of classes was set out for "little" Frank. In what was to become a pattern, Frank was learning to make the best possible use of his time.

Mathematics, science, and the arts are things everyone should know. Math and science are basic requirements for a real understanding of radio (and later, electronics). Luckily, the high school schedule also required a practical shop class to balance theory and hands-on experience.

There was no radio shop, but there was a good electric shop. After all, electricity works the same no matter what you call its end results. So electric shop it was. Motor winding, generator hookups, series and parallel hookups, three-way and four-way switching, taping and soldering, and house wiring all paved the way towards a final project of one's own choosing.

Now what would a radio ham build at school? A transmitter? - Nope. A receiver? - Nope. An antenna? - Nope. After all, in now two years of hamming, pushpull '45 rigs had given way to Taylor T-20 tubes in transmitters - Tuned Radio Frequency (TRF) autodynes had given way to superheterodyne receivers - and wire antennas were giving way to copper element beams. And things such as these were built at home to be operated from the "shack". So what to build in school?

Well it is ever thus, when one starts in radio, the objective seems to be more power and bigger rigs. Later on, one learns that bigger and better antennas make both transmitting and receiving better.

Large variable transmitting tank condensers (they weren't being called capacitors yet!) were very expensive and hard to get. So a wonderful electric shop final project was to design and build an all aluminum (new stuff then) split stator tank capacitor that would take a full KW. And when finished, it did for years.

There had to be a lot of time and activity overlap in these high school years - team sports, classes, homework, and yardwork chores - so ham operating and extra study of radio circuits had to be fit into early morning hours - like 4 a.m. to 6 a.m. and in the evening from 7 p.m. to midnight.

When the alarm went off (and often it didn't even have to!), out to the shack to tune up on 20 meters if that band was open or 40M or 80M if 20M wasn't. Strange call signs filled the air. U9NE, J2IX, ZU1T, FI8AC, VS3AE, U1AD, ES5C, GM6RG, VK2GU, were some of the ones most sought after.

Those signals were really weak and so were yours at the other end. When you got RST 339, (Readability, Strength, and Tone), you had it made; you didn't get mad because you didn't get 60db over S9 on every contact. When the "DX" didn't come back, it was time to rebuild or modify the rig or antenna until you were chased off to school or bed. When you got loose again, it was "get the rig going or the new antenna up" for tomorrow morning's DX (Long Distance Contact) session.

Where did one get the necessary knowledge to do this rebuilding and redesigning? Well there were a lot of ways then (and there still are now) The secret is to put otherwise idle time to use. Study radio and electronic magazines, books, and handbooks. Attend local radio classes to learn from chatting with others and listen closely to the technical talks. Get a part time job in radio repair. Those were (and still are) the available options.

Frank helped Denzil, W6LUR, his very good, but lots older, friend study for the commercial Radio Telegraph license. By the time his friend was ready, so was Frank. They went to the FCC together - Frank getting both Second Class Telegraph and Telephone tickets at the same time. Denzil wanted to join Paul and Warren as radio operators in the tuna fleet as soon as possible. Frank just went along for the FCC examination experience and to provide moral support for his friend during the exam. After all, a 15 year old still had two years of high school to complete before he could run off to sea!

During summer months, when there was no school, Frank got a part time job servicing radio sets at a local shop. The owner of this shop had straightened out the haywire of Frank's first attempt at wiring a tuned radio frequency shortwave (SW) receiver. Once he had learned that wiring had to be short and direct, as well as accurate, and that all junk box components don't always work, Frank was on his way to a better understanding of radio and its repair. He found that there was a good bit of pin money to be made by doing this service work, too. Later he set up his own repair business at home.

Although it wasn't apparent what Frank was going to do with his pre-academic high school diploma, his newly gained radio servicing experience, and his commercial tickets, they all seemed like good investments that somehow should be useful in the "real world".

And so it turned out indeed!

"College degrees and white collar workers are useless and can't be trusted, in that order", bellowed big Frank. "So now that you have graduated from high school, either go to a trade school or get a job", was the ultimatum handed down to now-not-so-little little Frank. (Sound familiar?)

Big Frank's points were well taken, because by now the DX bug had really put the bite on Frank and instead of putting extra time to good use, he was spending day and night DXing. Ten meter openings had been discovered
and 10M was a great DX band during the day - contacts with Egypt, Morrocco, and Mozambique were not unusual. However, hobby was beginning to overpower life and that's not the way things are supposed to be.

With the multitude of Franks, it must have been pre-ordained that the selected option would be Frank Wiggins Trade School in Los Angeles. They offered a communications course leading to FCC licenses. And they offered a radio servicing course. Well, since he already had the FCC licenses, the choice was simple; take the servicing course.

Servicing classes consisted of lecture and laboratory work, five days per week. The laboratory work was performed on radio sets brought in by outside people who wanted inexpensive repairs - and were brave enough to trust students to do the work. Joe Tami, the instructor, really had the knowledge, the experience, and the patience to make sure his students did a first class repair.

The combination of theory and practice was excellent; the only drawback was that Frank already had studied theory to this level and had lots of practical repair experience in outside shops. It wasn't long before Joe caught on and began to ask why Frank stayed in class when he could already hold down a job. He reminded Frank that the only way you could get a diploma from Wiggins was to have held a job for six months after you left school! So the die was cast; no more goofing off and cooling tests - go to work!

"Radio Drive-In Service" was the sign over the door, and it was one of the first shops to really mean it. Ninety percent of the jobs were auto radio installations and repairs, and the cars drove right into the rear of the building. By 1939 almost all cars could accept the popular new factory radio option installed at the dealers, or have separate radio company products installed after automobile sales. Radio Drive-In did the work for both dealers and owners. In either case, it took a contortionist to be able to get separate chassis, speaker, and dial assemblies in and out of cars. Standing on one's head with legs draped over the seat back became a standard way of life. (Frank often wondered later if that was what wore out the hair on his head at a premature age.)

Al, the owner of the shop, was a real professional in auto radio repair and installation. He knew all the tricks of the trade - how to repair vibrator contacts, how to clean and restore worn out volume controls by generous use of a soft lead pencil to replace worn carbon elements, how to align circuit adjustments on noise and weak stations, and how to properly ground sets, control cables, and antenna lead shields to get rid of ignition noise in auto radio receivers. In addition, he knew which cars needed wire screen on the floor boards, needed graphite powder in the tires, collector springs on the wheels, which cars could use under-the-running-board antennas, where to drill to avoid internal car wiring damage, and where to drill antenna holes to avoid the disaster of recognizing, too late, that there was no way to get to the antenna mounting bolts from the other side. Customers seemed to dislike extra and large unused holes in the fender or hood of their brand new car!

As an education, this job couldn't be beat. However, the salary could and the long hours (longer on Saturday!) could. So after about a year, and the successful awarding of the Wiggins' diploma at the six month checkpoint, a change seemed to be in order. In a way this job had gone to the dogs, for it had picked up an unwanted unexpected duty of morning clean ups after the closed in nighttime watch dog named "Static."

During several of W6MVL's ham radio contacts with people in the radio trade, discussions had come up about the need for good technicians at an aircraft component factory in the valley. It seems the Dutch were outfitting some American seaplane patrol craft for duty in the East Indies. A good, practical knowledge of radio transmitters and receivers, and their installation, was required, along with some practical troubleshooting experience. The work week was only 40 hours but the pay was 25% more than the radio shop paid for its 55-60 hour week.

With due apologies for leaving, and expressed thanks for a solid education in practical radio servicing, Frank left the retail world and went into the commercial arena. But it wasn't long before transmitter testing, receiver alignment and vacuum antenna relay assembly of the same identical gear over and over, became "old hat"; even though the pay and the hours were great. Further, it appeared that either an engineering degree or First Class FCC licenses would be required to make much upward progress on this job. And, of course, there was the added wanderlust of youth.

By now, Denzil, Paul, and Warren were all twisting Frank's arm to come and join them at sea. Shipboard operating experience would clinch the First Class Telegraph ticket, and some extra study would set up the success ahead in getting the First Class Telephone license. Besides, they chanted, there's a real education and good money out here on the briny deep!

Well, why not?

SEA DUTY

Standing at the rolling gunwale of a 150-ton wooden tuna clipper as it cleared San Diego bound for Mexican waters, Frank was intermixing his retching with curses upon those that had convinced him to come to sea. He was as green as the waters churning up under the heavy Southern California storm. It wasn't only the storm, but it, combined with the diesel fumes that came up through the deck of the combination radioroom/chartroom, was responsible for such uncontrollable physical response and the maldictions being heaped upon his erstwhile friends.

Getting this sea-going job hadn't been all that easy. If you didn't belong to the union, you couldn't get a job. If you didn't have a job, you couldn't get into the union. So for three weeks after making application to the radiomen's union, Frank had stayed in San Diego awaiting the break that finally came. When the MV Columbus docked with its latest catch of tuna, the radio operator left to get married and move East. There was no one on the union beach list and that condition held until the tuna clipper was ready to go to sea again.

Being on the spot at the right time and with the right background and licenses blended together to nail down the job. During the wait, Frank's seaman's papers and passports had been obtained and so at sailing time all was in order for signing ship's articles and launching a new career.

The radio equipment was not antiquated arc or spark, but was only one step removed from it. Somewere in the engine room was an alternator that provided high frequency AC to the rig's power supply. The rig itself boasted two sort of "sideways T shaped" 852 tubes that jiggled in rhythm with the ship's five cylinder diesel engine. They were in what was called a push-pull self-rectifying configuration that was supposed to put out a couple of hundred watts of wobbly modulated CW (code signals) somewhere around 36 meters. It would probably work if Frank could only find the switch - which was finally located under the table on which the receiver was mounted. The receiver was an early National AC-DC version of a short wave receiver - which could also tune somewhere around 36 meters. The only thing that would help the operator find a given frequency at 36 meters though was a Browning heterodyne frequency meter - if one could find the calibration chart that was supposed to go with its 0-100 division dial.

Although it was only one of Frank's several duties, the radio schedule was to copy marine weather, keep in touch with shore stations for ship's telegram message traffic, and to work with his own "code boats".

The weather watch was mandatory as tuna clippers of that era carried live bait in two or three tanks, located well above the water line to insure constant rolling of the tuna boat and to add to the likelihood of capsizing it. It seemed it was only incidental that the tanks also held several hundred scoops of small sardines or anchovies for chumming with live bait. Baja California and Central American waters are famous for their sudden and severe storms and many a tuna clipper was lost because it was caught at sea when it should have been in a safe harbor. An alert radio operator would have copied the weather forecast warnings that would have convinced the ship's skipper that it was time to leave the fishing area.

Ship's message radio traffic to and from the beach wasn't very heavy, but on occasion one of the crew members would send or receive holiday or birthday greetings, or the skipper would advise the home office what supplies were going to be needed for the next trip. Most traffic would occur during the week before arriving in San Diego so the crew could make shoreside travel and party plans.

High frequency shore stations such as KFS, KPH, and KOK would transmit their traffic wheel, "CQ de KTK QTC WFES, etc", over and over on several bands. This method of broadcast would let ships know which frequency was best for two-way contacts. As the ship's operator, Frank would tune the transmitter as close as he could come to one of the calling frequencies and call KFS, KFS until the traffic wheel transmission stopped. At that time he would sign his ship's call letters, WFES, and use international "Q" signals to state what traffic he had. If the shore station had indeed broken for WFES, KFS confirmed message information and advised of his traffic. Following this preamble procedure, ship and shore would continue sending and receiving until all messages were cleared from the "hook". Frank would then deliver the messages to the crewmen for whom they were intended.

The "code boat" situation was one that probably occurs only with fishing fleets. Every boat wanted to know where the fish were biting, but didn't want anyone else to know. On the other hand, a single boat couldn't cover the whole ocean by itself. So code boat arrangements were made between associated groups of boats.

Each island, bay, reef, bank, boat, fishing condition, etc., was encoded into three or four character groups. Participating boats would exchange code books so they could exchange messages via radio yet prevent others from evesdropping on the valuable conversations. At appointed times, code boats would keep their schedules to let each other know what kind of fishing success they were having, what other boats were within sight and how they were doing, what kind of weather conditions were being encountered, and whether both should join at the same fishing site.

Simple, but effective! There was always a challenge to try to break these codes. By using a crude radio loop antenna, bearings could be taken. Combining these with radio signal strength and information from his own code boats often gave "Sparks" a good handle for breaking some of the rival code groups and helping his skipper make decisions that could improve the total catch, and of course, improve the profit at the end of the trip.

By now Frank was responding only to his new name, "Sparks". It is doubtful that the ship's crew ever even knew his given name. If Sparks was to be an integral part of the small boat's crew, then he had to be part of that crew in all its activities: wheel watch, nighttime bait watch under the light, fish sighting watch, fishing from the racks, and icing fish in the hold. Meeting his radio schedules was almost a secondary activity.

Catching tuna with only a 6-foot bamboo pole and a fathom of fixed length line secured to a barbless hook, while standing in a metal rack outside of the boat in a sea filled with fish and sharks, is an experience long to be remembered. It is too bad that seining has taken over today, where once one- two- and three-man pole rigs used to pit human skill against an individual tuna. You just couldn't afford to let one of those fish get its head down, because he would win the tug-of-war. The Portugese fishermen would turn the air blue as the tuna would swing from side to side across all of the other fishing lines. However, if you were to let go of the pole and scare the school of tuna away, you might just as well jump in to the sea with it!

On his first trip, Sparks had learned celestial navigation from an old salt who then left the boat to retire. Previous studies of algebra and geometry had made it possible to deal effectively with hour angles, time sights, declinations, etc. With a gift of the old timer's sextant and the express approval of the captain, navigation was added to Sparks' other duties. Although his navigation was excellent, Sparks soon found out that no matter how accurate he was, he was considered a lousy navigator if there were no tuna to be caught at the target location when the boat arrived there. Conversely, he could be off position by fifty miles but be a super navigator if the boat landed a big school of fish!

Recognizing a novice seaman, the Portuguese crew did their best to turn Sparks into a real salty character. He had to grow a beard, had to join in their shoreside activities, and had to take their razzing -as well as that of the girls - when he would not join their extra curricular activities in the cafes of such romantic ports as Guaymas, Matzatlan, Puerta Vallarta, La Union, Panama, the Galapagos Islands, etc. Even though he didn't partake of the offerings, Sparks sure learned a lot of Spanish names for parts of the body that had never been discussed in his high school Spanish classes.

On the way home to San Diego in early December 1941, the crew was aghast as Sparks copied and distributed the news of the Pearl Harbor attack. No one could really believe such an attack had happened, but as events unfolded, Sparks would soon see that it really had - and was much worse than had been reported.

Out of the black night came an accusing winking light aimed at the bridge of the MV Columbus. It continued to flash "AA", "AA" in Morse code. No one knew what that meant, or even who was sending it. Only Sparks could even read it. He got his large flashlight, and knowing only radio procedure, asked in Morse code, "QRZ?", who is calling me? Then the unknown light kept sending "What" over and over. Not knowing what else to do, Sparks sent "K" and "GA", go ahead. Finally the light started to send a complete message. "What is the name and call sign of your ship?" "Where are you bound?" "Well why couldn't they have said so earlier," growled Sparks. It did appear that there was a difference between radio and visual light procedures.

It was while answering their questions with his flashlight that Sparks noted the inquiring light would send a brief flash after he sent each word. Since it appeared that an additional seagoing duty, bridge signalman, was going to be added, Sparks got a Navy signalman to teach him correct blinker, or flashing light, procedure when the tuna clipper got back to port. This new knowledge was to pay off in the many challenging days ahead during World War Two (WWII).

The Navy had commandeered a fully loaded merchant lumber ship in San Diego for a trip to battered Pearl Harbor. The radio operator on that old "steam schooner" had been sailing for some 15 years up and down the coast, from the Columbia River to San Diego, operating from a wheel chair. With World War II in full swing, the Navy would not let him sail any longer. Sparks, arriving on the tuna clipper and inquiring about signal light procedures, was the closest replacement and he was also willing to sail. Within hours he had signed aboard the SS Arcata (KESF) and was headed for Pearl with that full load of lumber. It was so early in the war that Navy convoys had not been set up for merchant ship routes, so it was somewhat disturbing to hear the SSSS (The wartime SOS used by ships in trouble from enemy submarine action) of several ships that were being torpedoed along the coast.

As the Arcata came close to Honolulu, Navy torpedoe and patrol boats closed in with blinkers flashing the now familiar "AA", "AA". This time a snappy response of identification from Sparks, turned "Flags" (Signalman), helped ease the Arcata into the harbor. After being boarded by U.S. Marines outside Pearl, the Arcata steamed through the rubble left by the Japanese attack; past sunken and broken ships that were not even mentioned in the news; through waters still covered with heavy fuel oil. The picture was horrible enough, but when the Marines added their stories of how little ammunition was at hand and how few aircraft were available to fight back on that Sunday morning, it was enough to make Sparks wonder about U.S. fighting might and how we were going to cope with this serious enemy.

As the war progressed a number of newer types of cargo ships began to appear, replacing a lot of the lost pre-war "rust buckets". There were C2s, C3s, C4s, Liberty, and Victory ships hauling cargo everywhere in the war zones of the world. Luckily, the radio equipment on these various ships was pretty much the same. The 813 tube type transmitters, the TRF 15-650 KHz receivers, the 2-20 MHz receivers, and the special distress auto alarm systems were a far cry from the antique rigs on the tuna boats. All were easy to master as Sparks went from one ship assignment to another during his sea going adventures.

Receiving was the only ordinary radio room activity sanctioned during the war. Radio silence was mandatory except when in distress situations. Sparks would have to break radio silence only twice during World War II. The first was to report an aircraft attack on his ship while sailing up the Bay of Bengal on the way to Calcutta. The second was to announce a torpedoe attack while entering Puget Sound while returning from the Aleutian Islands. Luckily, the "tin fish" missed, passing ahead of the ship as all engines were reversed as soon as the torpedoe detector alarm sounded and the track was sighted.

It was rather comforting to hear all of the Canadian and US shore stations repeat the SOS/SSSS messsage for the benefit of other shipping in the area. It was even more comfortable when Navy and Coast Guard ships and planes arrived at Sparks' ship location.

A lot of radio officers weren't as lucky as Frank, however. Many had been on two or three ships in just one day, as their rescue ships were torpedoed again and again. Others spent many days in lifeboats, as merchant ships quickly scattered away from SOS/SSSS positions to avoid becoming new targets themselves. Two schoolmates of Sparks later told him that they were really cursing him for encouraging them to use their amateur radio experience to get commercial licenses and sail as Radio Officers. Chet spent 27 days in a lifeboat; Dick only had to spend 21!

Communication oriented activities aboard a wartime merchant ship included coding and decoding radio messages, copying high speed press (News) reports, copying special messages to all merchant ships from naval authorities, standing a bridge signal watch in convoys where flashing light, semaphore, and flag hoist communications were carried out by Sparks. Later in the war, Navy signalmen and gunners were placed aboard armed merchant ships to handle such duties. On occasion, Sparks would help repair electric wiring in the engine room, in sound powered battle phones, and on the big-gun firing solenoids and electrical equipment.

Even during a war there are things that happen that can be enjoyable. Steaming into Tulagi harbor, Sparks was wondering if his brother, Floyd, was still based at nearby Florida island. As he stood on the bridge, a small navy craft approached with someone using his arms in semaphore fashion. Since it was in his area of responsibility, Sparks whipped out the ship's semaphore flags and answered with the universal "K", go ahead. "Who is your Radio Officer?" was the query. "Frank" was the answer to the boat. There was an audible whoop from the boat and the arms waved back "Howdy, this is Floyd".

A Navy boatswain's mate, Floyd, managed to get leave and spent the next two days aboard ship in Frank's stateroom. The two exchanged family thoughts and swapped sea stories. Floyd enjoyed the shipboard chow until he had to go and the ship readied to sail further north into the Pacific. Before the ship left Frank visited Floyd ashore. After chow there (boiled lamb liver, yet!) he understood why Floyd was so reluctant to leave his ship.

On another occasion, Sparks' ship was several thousand miles away from anywhere, on the great circle track between New Zealand and Chile, headed for Antofagasta and a load of nitrates. Suddenly, the general quarter battle station alarms went off and Sparks rushed to his post in the radio room. In a few minutes, the all clear was sounded, only to be followed a short time later by another GQ. This cycle was repeated a third time, and a fourth. On the fourth go around, Sparks went storming up the gangway to the flying bridge angrily demanding to know what was going on.

Stony silence met his inquiry as the bridge officers waited to see what was going to happen. Sparks was really asking for it. The skipper was "three sheets to the wind", a condition that is not allowed on any U.S. merchant ship at sea. However, all ended well when the skipper joined Sparks later in the radio shack, apologized, and complimented Sparks on being the only one with guts enough to complain. Of course the skipper could have thrown Sparks into the brig, too! At sea, the captain of the ship is a law almost unto himself.

Standing a radio listening watch when all ships are observing radio silence, and you are so far from any land that you can't hear any signals from shore stations, is monotonous. How to put this time to good use began to bother Sparks, who by now was firmly convinced that studying for the future always pays off. His concern was alleviated by enrolling in a good correspondence radio engineering course the next time he was Stateside. Sparks got all of his course books in the USA and later sent in the answers to completed lessons in batches from exotic ports of the world via Army and Navy post offices. Who needs education that you may never use? Well one never knows! Besides, studying sure helped to speed up the time that was dragging previously.

At the close of WWII, merchant ships went back to regular radio sending and receiving watches. The frequencies around 500KHz and at 36M came alive again. In addition, amateur radio was reauthorized, but temporarily only for 10 meters. This relaxation of radio silence and authorization of two-way radio led to some exciting times during continuing trips in the Western Pacific. The merchant marine was still very active in relocating personnel and strategic materials at this time. Even though the war had ended, the wrap up took some doing.

At Guam, Sparks had rescued some 400 cycle power supply parts, along with some small radio tubes and components from the junk heap. They were literally snatched from the blades of bulldozers dumping and covering up surplus equipment. These rescued parts were used to build a 10 meter converter for the ship's SW receiver. The power transformers were turned around to become modulation transformers for pushpull surplus 6L6 tube modulators. The 120VAC 400-cycle transformers provided a much more enjoyable audio source than did the original 800 Hz motor generator used to provide "A2" (modulated CW) on the merchant rig.

A few slight adjustments to the SW transmitter got it to double in the final to 28MHz, the 10 Meter band. The whole homebrew combination and the skipper's permission put W6MVL mobile marine on the air from Asian waters. Phone patches home for the crew made Sparks a very popular guy aboard that ship. The disbelief in the skipper's wife's voice was apparent, and a source of amusement aboard ship, as she almost refused to talk over a San Francisco ham's phone patch. She kept insisting her husband was at sea between the Philippines and China and there was no way he had ever been able to call home or could be on the telephone!

Even though it really enhanced the morale of the crew, the full value of this jerry-rigged voice modulated merchant ship transmitter wasn't realized or appreciated until the ship was anchored in Okinawa during a terrific tropical typhoon.

In an earlier typhoon, when all ships had been ordered to sea out of Buckner Bay, a heavy deck load of 50-ton cranes had shifted, fallen off the hatches and cracked the ship's deck beams and gunwales. So when this new and bigger typhoon hit, the skipper requested and received permission to stay anchored in the bay where it was shallow. With both anchors out and the engines turning slowly ahead, Sparks' ship still managed to be blown astern some 400 yards as the winds pummelled the entire Okinawa area.

Ashore, all 500 Khz distress facilities were out of service as buildings and antennas were destroyed by the violent winds. The only shore station intact and operating was on 2.7 MHz but could only use voice transmission. The operator on duty was not trained in Morse code, nor was the equipment designed for it. Consequently, all attempts to contact him via the ship's CW mode failed.

Hundreds of Merchant and Naval ships foundered or went aground in the storm, but there was no island emergency watch facility on 500 KHz. However, Sparks was monitoring all of this maritime distress traffic, acknowledging it from his anchorage in the bay, giving direction finding bearings to ships who had lost their position in the storm, and keeping his captain informed.

With the skipper's permission, Sparks connected up his "10 meter band" modulator and tuned the ship's transmitter to 2.7 MHz instead of 10 meters. Even though it wasn't originally equipped to do so, distress traffic was being relayed to shore on the Navy's 2.7 MHz band by a merchant ship using a rig that had been modified for 28 MHz amateur voice operation! Fortuitous indeed, and legal only in an emergency, but demonstrating again that earlier events can have very unexpected and beneficial payoffs in the future.

There was another adventure in wait for Sparks' WWII career, one that was another of those fortuitous happenings that was to have some long range rewards. While the ship was docked in Philadelphia, having brought a load of sugar up from Cuba, Sparks and his Deck Cadet friend were out bowling. It just so happened that these two innocent sailors were bowling on the lanes alongside two very attractive young ladies.

One thing led to another, as girls and boys and uniforms and bowling in combination can make happen. So after bowling came Chinese dinner, for four of course. Another day, another date between Sparks and Cecelia. After a few more days and dates, Sparks had to fly home to take another West Coast ship to sea.

Although it wasn't associated with radio, Sparks sensed something new had entered his life. Only a few days passed, before he called Cecelia long distance to see if she'd like to come to California. She asked, "What for?" When Sparks suggested they might get married or something, Cecelia said "Yes, but you can forget about the 'or something'."

Big Frank had connections on the railroad, where he was now well up in the Brotherhood ranks. Thus he was able to arrange the trip in the midst of wartime, when tickets and reservations were hard to get. But he almost blew everything when a roundtrip train ticket was mistakenly(?) sent to Cecelia instead of a one-way one.

Although they had only known each other a very short time before they were married, Cecelia was the best thing that ever happened to Sparks he decided. After many trips between South Pacific islands, and after the big typhoon at Okinawa, Sparks' ship was sailing from Shanghai for Los Angeles. The first terrible sounding arc transmitter Sparks had ever heard was XSG in Shanghai. And now this station was really giving Sparks the rasberry with its tone and a message that diverted his ship to Gulfport, Mississippi instead of much closer Los Angeles. This bypassing of Los Angeles would add another two weeks to the homeward bound voyage, thereby causing Sparks to lose much of the popularity he had gained by virtue of the phone patches home.

On the way through the Panama Canal, Sparks got to thinking. He decided now that the war was really over, it was time for Sparks to go ashore to stay. Cecelia acclaimed that decision wholeheartedly.

SHORESIDE RADIO

What does a sea-going radio operator do now that he is ashore for good? Well Sparks had to consider this in the light of what he knew, what experiences he had had, and what was available in the area where Cecelia and he decided to live.

Cecelia was from Philadelphia, but after living in California she had no interest in returning East. Sparks, now getting accustomed to being called Frank again, was from Los Angeles. They were living in San Jose, which was as close to the San Francisco seaport as Cecelia could get during the war-time housing shortage.

Six weeks of looking around Los Angeles showed the folly of leaving the fertile Santa Clara Valley and San Jose for the smog and turmoil of the big city. Once their decision was made to stay in San Jose, the job decision had to be addressed in earnest. San Jose was still a small farming community of about 50,000 people and had no radio, or what was later to be called electronic, industry. Radio servicing was a possibility that didn't seem too bad. Further, the leading radio store in town was looking for someone to head up its repair shop and get rid of the big backlog of war-time "unfixables" saturating its storage areas.

That was it. Repair AM radios, auto radios, phonographs and the newly emerging FM radios. Antenna and RF coils were rewound by hand, substitute capacitors, transformers, and tubes were used to get sets out the door as exact replacement parts still were not available. New sets began to appear but in the press of meeting postwar market orders, many needed attention before they could be sold. Automatic record changers and wire recorders needed repair and adjustment. It was a frantic time, but a very rewarding one for Frank, as his earlier repair skills and makedo experiences were recalled. The shipboard course engineering knowledge was also integrated into action to subdue a wide range of difficult service problems.

And where do you think this job led Frank? His unused First Class FCC Radio Telephone license came out of the mothballs when the radio store owner decided to install and operate his newly acquired AM broadcast station. Again it was happening. Another unexpected fortuitous result of an earlier action taken merely to fill idle time with extra study.

Installing a radio station, literally from the ground (plowing in the wire ground radials) up was Frank's newest and most exciting job. New equipment going into a new building; planning cable requirements for audio and RF lines; studio, announce booth, and master control room console installations; working with directive antenna design engineers; and learning the ins and outs of how a station was to be programmed all combined into another experience of a lifetime.

As the equipment bugs were ironed out, and routine maintenance procedures became effective, the equipment required less attention. There wasn't much full time engineering left for a Chief Engineer to do. Early station operational expenses came due, and the financial squeeze was on to minimize staff. So, the Chief Engineer was pressed into announcing service, first to fill announcer schedule gaps and later to cover his own shows.

Ham radio microphone work would appear to make announcing a natural occupation. However, the incorrect cadence of delivery, the poor enunciation, and emphasis on the wrong syllable were awful to behold for the listener. These are the characteristics of an announcer not skilled in his art. Here was a time when no advanced training would come to Frank's rescue. He had to do something and do it quickly. Two things were clear. One was that professional voice help and training was needed. The other was to figure out what to do with all of that time between the beginning and end of musical recordings, transcriptions, and network programs.

The voice training consisted of having a paid coach who explained the mechanics of voicing and projection. He would have Frank read aloud from typical radio commercial copy. When he made mistakes, Frank would receive exact instructions on what to do and say and how to say it. This voice coach soon made Roy, W6KTY, of the earlier radio club class look like an old softie. But, carried by his technical expertise until he could become a proficient radio announcer, Frank finally made the grade. And then came the newest unexpected twist.

On Sundays at 6:00 a.m., and after weekly transmitter maintenance, Lalo aired an hour long Spanish program called Fiesta Matinal. He was the only announcer so had to work seven days a week. Frank was his studio engineer.

On one particular Sunday, Lalo didn't show up at 6:00 a.m. After replaying the show's theme song, Frank went to get Lalo's records from the music library. Saying nothing, Frank switched from theme to a Mexican ranchero record. Still no Lalo and still no phone call from him. What to do? Commercials were coming up on the schedule and Frank knew that Lalo needed the money his commissions brought him.

Well, why not! In high school Spanish, mellowed somewhat by tuna clipper Portuguese, and South and Central American conversational use during the war, Lalo's spot announcements were aired as "Pancho" (Spanish equivalent of Frank) took over the commercials. Once committed, Pancho continued by announcing title and artist introductions for the rest of the records!

Along about 7 a.m. the station phone began to ring. Listeners wanted to know who "Pancho" was and where Lalo was. Luckily about that time, Lalo, whose car had had a flat tire (and no spare) on the highway leaving San Francisco and couldn't get to a telephone, finally arrived. And what a happy Lalo he was! He said could now take off at least one day a week and use his new guest announcer, Pancho, every Sunday morning.

Frank's investment in voice training had been mandatory for the present, but it was to pay off even more handsomely in the future. The announcer voice training and experience, made public speaking and oral presentations easy and effective.

The "record-duration waiting" time analysis had yielded an answer, too. Why not enroll at San Jose State College as a candidate for a BSEE degree? Study and do homework between record starts and finishes. There is something that bolsters one's ego when he learns that he can simultaneously carry out announcing duties, hold a slide rule at a critical setting, answer homework problems, meet network and newscast timing schedules - and not get fired!

With the station owner's blessing this activity continued for about 4-1/2 years. It culminated in a BSEE in Electronics for Frank, and an intercollegiate student competition award for best technical presentation. During this period, Frank gained additional recognition for the design of an effective Conelrad cluster control unit and for carrying out FCC Conelrad coordination in the San Jose area. (Conelrad was a government method used for a short time to put several area radio stations on the same (640 or 1240 KHz) frequency. Switching from one station to another in a random sequence was supposed to provide continuous broadcast information to area listeners, while giving confusing bearings to radio direction finders (RDF) units aboard enemy bombers. Radar subsequently became so accurate that bombers relied on it and not bearings from broadcast band AM radio stations). This Conelrad responsibility gave Frank an easy working relationship with other station owners, which in turn helped when Frank continued to do radio station engineering consultation later on.

Again came the press for more adventure in electronics, a term being used now more than radio. After Frank received his degree he began to think about leaving the world of technicians and becoming a Professional Engineer. Frank made this move, but he kept a tie with the technical radio side of things by doing AM and FM broadcast station maintenance and installing automatic music and announcement control systems on a contract basis. He also set up a part time business at home doing two-way radio maintenance for hams, business, CB, and maritime radio users. These technical activities were to be a firm support from which to launch his newest career.

THE PROFESSIONAL

After helping Joe, the station owner, find a suitable replacement Chief Engineer, and armed with letters of introduction from the college engineering office to several communications and electronic firms, Frank was off to the white collar world, to use a phrase from the railroad union vice president, big Frank.

The choice of position (no longer job!) was hard to make as the combination of technical background, engineering level training, and letters of introduction opened a lot of doors. Well, with two-way and maritime radio running in Frank's blood, the choice of a small maritime and mobile radio manufacturer was really a foregone conclusion. Funny thing though, all of these professional positions offered less money to start than the radio station had been paying. Frank's explanation to more-than-patient Cecelia was, "The old rate was the top, the ceiling; the new rate is only the beginning, the first step on a higher ladder." And how true that turned out to be. Proof of this came to Frank through his continuing consulting work with the radio stations. The radio station wage ceiling was higher than years ago, but it continued to be way, way below what Frank's professional assignments paid.

Frank's first design assignment was really a redesign project - modify and update an older radio direction finder product. Recollection of the emergency RDF work at Okinawa and those half-hearted attempts at locating tuna code boats by loops was vivid in Frank's mind as he started the redesign. Receiver sensitivity, resonant loop dimensions, sense antenna couplings were calculated. Sheet metal and cabinet designs were part of the electronic engineer's duties in a small struggling company. This complete package approach required that practicality really be combined with theory. Frank was reminded of the necessity as this blend during each episode with the cantankerous fabrication shop foreman, who would storm into the design office inquiring loudly what so and so idiot made this drawing. He always said it couldn't be bent into such a shape or that if it could, it wouldn't fit anyway. His bark was worse than his bite though, and Frank really appreciated the contributions from this old Irish character.

Once the RDF product was successfully launched, there was work to be done as part of teams designing new two-way AM fishing boat and yacht radio, and FM mobile radios. Improved receiver sensitivity, immunity to front end overload when two boats were talking via radio and almost bow to bow, better transmitter efficiency with the short loaded antennas used on boats, and improved noise limiter designs for noisy marine engine static elimination were the chief design considerations of the AM effort. Better sensitivity, better quieting and more stable operation were required for the FM effort. Time flew by as these designs were implemented, field tested, and sold successfully as products.

Unfortunately, while the work was interesting and challenging, the twice daily risk of driving up and down the old three lane "Bloody Bayshore" highway, for 20 miles in each direction, began to make even the dangers of WWII merchant service look tame. So Frank submitted his resignation to take a job closer to home. The way the electronic industry was expanding in the Santa Clara valley made the job change easy. Each job change seemed to come with a pay increase that helped recoup those earlier losses associated with his entry into the professional ranks.

After a short stint designing a permanent magnet charging power supply for klystron magnets and helping design an automatic VSWR (Voltage Standing Wave Ratio) plotting instrument for a company that suddenly moved to L.A., the new world of computers beckoned to Frank. Although it wasn't clear at the time, the places of analog radio circuits and digital control circuits were on a course of being blended. And it appeared that the Santa Clara valley was the right place to be to participate in this melding.

Working for a large computer manufacturer after working for small companies at first seemed unreal to Frank. His first design project looked like a 90-day job to him. Wiser heads decided it would take six months. When his computer storage file testing control unit was working and accepted in only 80 days, the first of many promotions came along. That part of big business was one Frank came to really like - merit rewards for jobs well done.

A computer storage file is a lot like a communication system - the computer sends messages or data down a transmission line to the file and expects a reply. It expects confirmation that the intended addressee has received his message. Later on, the file will transmit data to the "outside world" of the computer, or CPU, and it expects the same kind of acknowledgement. Hence, the data file design must consider the information source and speed, data format, and addresses, then store, check, and confirm receipt, just like a two-way radio message circuit and its procedures.

Signals from a magnetic head are analog or completely variable in nature. They have a frequency and have bandwidth requirements. They subsequently are converted to a digital code and assembled into a message stream containing an address, a character count, and information content. Frank found that digital circuits were really his old friends called amplifier circuits, only instead of preserving wave shapes, these circuits were driven to either one of two states, to cut-off or saturation. During the change of state, or rise time, the circuits were operating analog and this part of circuit design really seemed to give straight digital engineers a hard time.

An adaptive radio computer data transmission design that Frank worked on had sending and receiving RF circuits, antennas, and required a knowledge of propagation predictions. The computer portion would assess error rate, consult a control vocabulary and tell the computer at the other end of the system to change frequency, send faster, or send slower. This device had all of the characteristics of a human operator radio message system, including insistence on origination and destination information, a check on message accuracy, and the equivalent of "Q" codes that would tell operators to send faster (QRQ), send slower (QRS), or change frequency (QSY).

Frank found that while electronic circuits were getting smaller and smaller and that emphasis was on digital information, total system design still needed a combination of theory and practical experience along with a combination of digital and analog circuits. His project activity included designs of systems to track materials handling vehicles through a warehouse, to allow automatic ticketing and boarding of rapid transit trains or aircraft, to handle point of sale information, to automate insurance underwriting, and to control entry and exit from security oriented buildings. In the outside world of radio, equipment was also getting smaller and smaller. And these tiny packages were successfully utilizing digital logic control of RF analog circuits.

Progress in the professional world seemed to force Frank more and more into the overall decision process, not just the technical one. Project command required an ability to get along with people, and yet be skillful enough to get them to work hard enough to meet product goals. He encountered more and more of the P's (pressure, people, politics, pencils, paper, planning, pay, performance, personnel) and fewer of the T's (technical, testing, time, thoroughness, thoughtfulness).

To keep his sanity and technical expertise while carrying out his professional project efforts, Frank began to increase his participation in amateur radio hobby activities. He was chairman of a divisional, and later a national ARRL (American Radio Relay League) convention. He helped to initiate radio training classes at local radio clubs. He taught beginner and advanced radio classes at clubs, in Adult Education, and at the Community College level. He presented technical talks on mobile radio, direction finding, antennas, receivers, and transmitters at area club meetings.

"This amateur radio activity sure seems familiar," mused Frank one day. Then he began to see the picture that was forming. He was now on the "sending" side instead of the "receiving" side. He was beginning to do for others what those old timers had done for him in early 1935!

Maybe it was time to realize that he now was one of the current "old timers". If this were true, and it seemed to be, Frank began to think it was time to consider professional retirement. Just about the time he reached a conclusion to consider retirement in earnest, a new kind of job assignment appeared on his current professional employment scene. Frank was offered a chance to provide technical support to a group of lawyers counselling the company he worked for.

What a way to learn about what goes on in trials. Learning about documents, preparation for trial, what goes into a legal offense, into a legal defense, how one counters a plaintiff or defendant, should be fun to learn. What such knowledge would be good for wasn't too apparent at first, but that had never stopped Frank before. In later deliberations, he finally awoke to the fact that this trial procedural information was just what he needed if he were to be effective in helping his consultation customers in front of FCC hearing boards. So with this in mind, Frank accepted the new assignment with relish.

For three years, Cecelia and Frank were apart most of the time as he stayed in Los Angeles the first year, and in San Francisco the next two years. His company was helpful in that they allowed him to commute home for his class teaching schedule and for a day off once in awhile. Cecelia once remarked that although they had been married over 35 years by the calendar, it was really only 15 when you subtracted the years spent apart during the war, during Frank's combined fulltime work and school when he was never home except to sleep, and now this litigation separation. However, she was still the loyal wife and helpmate, knew the benefits of past sacrifices, and so helped Frank see the new assignment through.

At the end of the litigation, they both had another tough decision to make: should Frank retire or not? Inflation was eating away at their retirement plans and funds. Although they didn't really mean retire, they did think there must be a way of enjoying their remaining years together. It would give them time to pursue mutual interests such as travel, finance, bridge, and of course, bowling.

Frank also thought it was time to seriously consider repaying the educational system from which he had received so much benefit. Good ways would be to increase his teaching and publish a book or two on electronic servicing techniques. After all, one never knows where new activities and choices lead.

The conversion process from an early non-technical life began with entering a quasi-technical hobby with the help of others. Then technical expertise was enhanced by listening to technical talks, working for knowledgeable people, studying available pamphlets and books, and by taking correspondence or formal classes. Success involved learning. In fact, the whole concept of finding future success requires one to fully utilize one's spare or idle time. Success requires not only internal drive, but someone else's help. This help can be either personal or via written material, but it comes from others and their knowledge.

Frank, "Sparks", and "Pancho" made his decision with the help of Cecelia to repay the system in several ways. He retired to devote part of his time to teaching college level electronic classes, part to supporting amateur radio club activities, part to writing books, and a whole lot to Cecelia. After all, her comment about being married for only 15 years while the calendar had ticked off 35 was a true statement. It was time that they did more things together.

Over the years Frank and Cecelia maintained their love of the game that had brought them together. They were members of mixed bowling teams and carried personal averages that were very close. They were fierce but friendly competitors. The successful publication of a book on electronic repair, written by Frank, found them both responding to mail requests, folding papers, and inserting books into packages and boxes for mailing all over the world. The part-time radio repair service expanded now that Frank had more time to devote to fixing equipment. This expanded activity brought a flow of new acquaintances and friends into their lives as people called or brought in their problem equipment. Cecelia was getting very conversant with the technical terms radio people used. She even attended one of Frank's electronic classes to improve her knowledge.

Merchandising the book and the equipment service created opportunities to travel to radio conventions all over the States. This coupled with visits to friends and family answered the yen for travel that Cecelia and Frank had nurtured for a long time. And, "just in case", Frank renewed his Radio Officer's and Seaman's papers. Radio Officer and passenger might want to enjoy a sea voyage together one day.

Following up on investments made in radio stations and radio station music and programming services, combined well with Frank's station consulting to keep up a full time activity in this so-called retirement.

The end result of a lifetime that began with a simple hobby was a successful career and an active retirement. Frank didn't think one could ask for more out of an entire lifetime. If asked what message should be etched on Frank's tombstone - which will probably be a replica of a radio tower instead of one of flat marble - he would want it to say, "Take full advantage of your present idle time to prepare for a wonderful future. Pick a challenging hobby that can lead to a successful professional career."

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